museum of the Duke of Sutherland by Dr. Joass, of Golspie. These were afterwards analysed by Prof. Heddle, of St. Andrews, and found to be the variety of orthoclase felspar, termed amazonstone. For the purpose of more careful examination as to the mode of occurrence of this uncommon substance, Prof. Heddle has recently visited the locality, which is the side of the ridge rising to the east of the village of Tongue. He found the granite mass to be merely a large boulder, and had it thoroughly broken up. It has yielded the following remarkable assemblage of minerals:—amazonstone in simple and twin crystals, radiated cleavlandite, lepidomelane, pinite, fluorite, sphene, zircon, magnetite, ilmenite, allanite, smoky quartz with peculiar faces, and a mineral which a carefully instituted comparison shows to be thorite passing into orangite. The specimens of amazonstone obtained from the boulder are of unparalleled magnificence. One which has been sent to the museum of the Duke of Sutherland exhibited a surface of some three square feet, about a dozen large crystals, of which eight were unbroken and perfect. One crystal, unavoidedly broken in the extraction, showed the following extraordinary dimensions:—viz., a length of 15½ inches, with a breadth and thickness of ten and eight inches respectively. The minute structure of these crystals is peculiar, and has been fully described in a recent paper by Dr. Heddle on Scottish felspars in the *Transactions* of the Royal Society of Edinburgh. The exceedingly rare thorite was found in only a small quantity. From an examination of the granite of this and other boulders on the same hill, it appears that they have probably come from the huge mass of Ben Laoghal, which lies a few miles inland to the south-west. Should this be their origin, we may expect yet to find new sources of amazonstone, and perhaps other rare minerals among the numerous corries and crags of that picturesque mountain.

TERTIARY LEAF-BEDS OF COLORADO.—Mr. E. L. Berthoud, of the Territorial School of Mines, Golden City, Colorado, sends notes of a section near that place which presents some considerable resemblance to the sections in Antrim and Mull, where the miocene leaf-beds and lignites are associated with sheets of basalt and tuff. The order of succession is as follows:—

Basalt	120	feet
Lignite and leaf-bed	2½	,,
Hard muddy clay and sandstone	13	,,
Second leaf-bed	3	,,
Clay, sandstone, conglomerate	40	,,
Third small leaf-bed in clay	2	,,
Sandstone and clay, &c.	30	,,
Basalt	25	,,

The resemblance is further borne out by Mr. Berthoud's list of plants, which includes *Platanus aceroides*, *Filicites hebridica*, *Populus arctica*, *Corylus McQuarii*, *Fagus macrophylla*, *Quercus chlorophylla*, *Sequoia*, sp. (?), *Gymnogramma Haydeni*, *Cinnamomum*, n. sp., *Ficus*, 2 sp. nov., *Magnolia*, 2 sp, *Juglans*, 2 sp., *Sabal Campbellii*, *S. Grayana*, and *S. goldianus*, *Myrica*, &c.

INFLUENCE OF ANCHOR-ICE UPON FISHING-GROUNDS.—Prof. Hind, to whose late researches in Labrador we recently called attention, has published some remarks on the effects of the formation of ground-ice in retarding the decomposition of fish-offal, and thereby in seriously damaging the value of the Labrador fishing-grounds. He shows that the ice formed on the sea-bottom freezes the offal, and protects it from being devoured by sea-scavengers and from decomposition; that every rise in temperature which prevents the formation of anchor-ice promotes the decomposition of the offal; that when this takes place, as it does every year under a covering of surface-ice, the water, not being aërated, becomes foul with gases and from the removal of its oxygen, and that the result is fatal to the young cod and other fry which then seek the coasts in search of food. He states that vast multitudes of the young fish are, from this cause, destroyed every summer and autumn in the bays and fjords, and he accounts for changes which have taken place in the migratory movements of seals by this wholesale destruction of the food which they used formerly to find in the coast-waters. He recommends the utilisation of the offal, which would not only eventually prove remunerative as a source of artificial manure, but would remove the poisonous gases which are set free on the melting of the anchor-ice at a time when they cannot fail to prove highly destructive.

ORIGIN OF THE TREES AND SHRUBS IN THE SOUTH OF FRANCE.—In a recent memoir presented to the Academy of Sciences of Montpellier, the veteran professor Charles Martins discusses the history of those trees and shrubs in the south of France which suffer from severe cold, such as the carob-tree, oleander, European palm, myrtle, sweet-bay, pomegranate, olive, fig, laurustinus, ilex, vine, and others. He shows that most of these occur among the tertiary and quaternary deposits, that some of them, indeed, like the oleander (*Nerium oleander*), go back even into eocene times. He points to the fact that their remains occur in the geological formations, not only of the countries where the plants are still living, but even of tracts considerably further to the north, both in France and in Switzerland, where their living descendants or analogues could not endure the severity of winter now. The tender trees and shrubs of the Mediterranean seaboard thus serve to prove the former warmer climate of France and its subsequent refrigeration. They are merely the surviving relics of a tertiary vegetation preserved by the exceptional mildness of the climate in which they grow. A single winter of exceptional rigour, or even a single night of extreme cold, like that of January 13, 1826, when the thermometer fell to 9°·7 below zero (Cent.), would suffice to destroy them. It may be presumed, however, that during at least the height of the glacial period these tender plants were driven southwards beyond their present northern limits, and that they have subsequently crept north again.

U.S. NATIONAL ACADEMY OF SCIENCES

ACCORDING to the terms of its charter from Congress, the National Academy of Sciences must hold its annual meeting in April, at Washington. It holds also a semi-annual meeting in the autumn. Its membership has been very slowly increasing, till now it numbers nearly, if not quite, 100. At the last meeting, April 17-20, Prof. Henry presided. The Academy resolved to present a memorial to Congress, in favour of the establishment and maintenance of an International Bureau of Weights and Measures with the object of promoting permanence, precision, and uniformity in the standards, by the joint action of the leading powers of the world, according to the convention submitted to the Senate.

Five new members were elected:—Prof. John W. Draper and Dr. Henry Draper of New York, Dr. Elliot Coues of Washington, Dr. S. H. Scudder of Cambridge, Mass., and Mr. Charles S. Peirce of the U.S. Coast Survey.

The annual report of the president, Prof. Henry, recounts briefly the year's work of the Academy. The Academy reports progress in the work of preparing and publishing the scientific results saved from the wreck of the *Polaris* and in general contributed by the expedition in which that vessel was engaged. This work is in the hands of Dr. Emil Bessels, the scientific director of the expedition, and will be finished in three quarto volumes. The first volume is already published; it is a quarto of 960 pages relating to astronomy, pendulum experiments, winds, solar radiation, and meteorology in general. It is illustrated by fourteen plates, two maps, and forty woodcuts; only 500 copies of this volume were printed. The second and third volumes relate to geology, palæontology, mineralogy, botany, zoology, and ethnology. They will include a monograph on the Eskimo, illustrated by 100 plates and 200 woodcuts. The Academy has divided the income from the Bache fund, so as to

cover several distinct researches, as follows :—(1) On sun-spots and chromosphere, conducted by the late Prof. Winlock ; the results are published, with plates, in the transactions of the Harvard Observatory. (2) Magnetic survey of the United States, in charge of Prof. J. E. Hilgard ; during the year twenty-five new stations in New England and Lower Canada have been occupied ; at all the stations the dip, declination, and horizontal intensity are observed. (3) Comparisons of sensations of light ; in charge of Mr. Charles S. Peirce. The object is especially to ascertain the mathematical formula connecting the capacity of the eye for light sensations with the physical variations of radiation ; two sensations are compared, the one fixed, the other variable ; part of the results have been published. (4) Researches on the distribution of heat on the solar surface, the laws of its radiation and absorption, and effects on terrestrial climate ; conducted by Prof. S. P. Langley. (5) Researches on the laws of sound and the duration of vibrations of tuning-forks ; conducted by Prof. A. M. Mayer. The work of utilising the observations made on the transit of Venus is under direction of a committee of which the president of the Academy is a member ; progress has been made in this work, but it is scarcely yet ready for report. The endeavour to obtain an appropriation for a permanent building to display the scientific and other material contributed by the Government of the United States and other nations during the Centennial Exhibition, failed to obtain a two-thirds vote in the House of Representatives after passing the Senate without dissent. The effort will be renewed at the next session of Congress. The collections are large, valuable, and instructive, including the costly gifts of other nations, and the entire exhibit that was in the "Government Building" at Philadelphia.

During the meeting the members of the Academy were formally invited to visit the President of the United States at the White House. They were duly presented, and President Hayes expressed himself in a brief speech as fully appreciating the value of scientific pursuits, and willing and desirous to advance the interests of science. The reception was notably pleasant and cordial.

We give abstracts of the more important communications :—

Prof. Alexander Agassiz gave a brief notice of researches on the young stages of some osseous fishes. The history of previous researches on these points, since those of von Baer at the beginning of this century, was reviewed. Prof. Agassiz concludes that with few exceptions the tail begins to be formed below the dorsal cord. If embryos and very young animals are examined, a lobe is found much developed in some and common to all. The tail fin and the anal fin are probably modifications of the same organ. There is a general uniformity in the plan of construction of the tails of fishes whether osseous or otherwise.

Under the title of "Some Results of Deep-sea Dredging," Prof. Agassiz stated views partly founded upon his general knowledge and study of the products and observations made during the *Challenger* expedition, and partly upon information obtained in conversations with Prof. Sir C. Wyville Thomson and other members of the expedition. The fact of a point of zero temperature being in all oceans but varying in depth with latitudes, had been indicated by previous expeditions and was fully established by the *Challenger* observations. At the equator a depth of 500 fathoms is needed to reach this zero line ; as we approach the poles the depth of this line decreases till at last it is at the surface. Sometimes the temperature of the lower water is 2° or 3° below zero, but the conditions are, in general, uniform. Equally uniform is the fauna below this line. Above it, the arctic, temperate, and tropical faunas are clearly distinguishable from each other. There is a remarkable uniformity among the animals of the tropical fauna, such as may have resulted if in a previous era the isthmuses of Darien and Suez were absent, the Sahara was covered by the sea, and an equatorial current swept freely around the world. The deep-sea fauna is so singularly like the cretaceous that its forms would have been at once assigned to that epoch by most palæontologists if they had been fossil. The similarity if not identity of these forms indicates that there has been scarcely any change since that era. This is true of echinoderms, worms, and even of some fishes. It is equally true of some shore animals found both off our coasts and in the chalk. These have been subjected to the most varied conditions of existence as compared with their ancestors, and yet have not altered. There is evidence that natural selection, even under conditions where its forces are extreme, may not bring about any change. The present continents are probably much older than has been supposed. There is an entire want of evidence that great continents existed where oceans now are. The shore mud from our continents is washed down comparatively only a few miles from shore ; the depths are not reached by this mud. Other well-known theories need to be modified. At a depth of 2,500 feet crustacea are found having good eyes. These organs have undergone no change during innumerable centuries. There are similar facts established as to starfish. There is no very great number of blind animals in the ocean depths. Those that are blind need not be classed as retrogressions from ancestors that had eyes. Both as to blind animals in the sea and those found in caves, it seems most probable that they were the descendants of eyeless ancestors. In the discussion which followed this communication, Prof. Agassiz said that he had long doubted the theory of geologists respecting an immense miocene continent.

Prof. Joseph Le Conte, of Oakland, California, furnished a paper on critical periods in the history of the earth and their relation to evolution ; and on the quaternary as such a period. This paper instanced and enlarged upon the breaks in the geological and palæontological records, and argued that a more rapid rate of evolution had been operative during the intervals, which he designated as "critical periods." The quaternary era he regarded as one of these critical periods during which rapid changes had taken place, but it differed from most of such periods in the fact of its records being preserved.

Prof. G. K. Gilbert described the characteristics and mode of formation of the Henry Mountains.

Dr. F. V. Hayden described the results of boring artesian wells in a locality near Rawlins Springs in Wyoming Territory on the line of the Union Pacific Railroad. The district is on the dividing line of the watershed of the continent, some of the streams on the sides of the district flowing to the Atlantic, and some to the Pacific oceans. The rainfall of the district is very small—not over six to ten inches per year. The wells were bored to depths varying from 300 to over 1,000 feet. The water obtained was from 1,000 to 2,000 gallons per hour ; it was lifted by pumps driven by windmills. The result showed the feasibility of thus irrigating very arid regions. The wells were bored under Dr. Hayden's direction, in a sinclinal basin which he regarded as of tertiary formation, probably eocene ; but palæontologists who had examined its fossils had pronounced them cretaceous. Dr. Hayden regarded this as an instance where the chasm between the cretaceous and tertiary rocks was bridged over ; he stated that the rocks were consecutive from cretaceous to middle tertiary. This opinion was not fully shared by the other geologists present, and the discussion which followed became exceedingly animated, as it brought up questions long at issue between the respective students of the rocks and of the fossils of that region.

Major J. W. Powell presented some remarkable facts respecting the public domain of the United States. Dividing the United States into two portions, the humid, where the rainfall is sufficient for agriculture, and the arid, where it is not, the latter is found nearly to equal the former.

Prof. Elias Loomis, of Yale College, contributed his seventh paper of a series entitled "Contributions to Meteorology," this paper continuing the investigation of rain areas which was begun in the last. Prof. Loomis selected all the cases in the United States during fifteen months—September 1872, to November 1873—in which the reported rainfall amounted to at least eight inches in eight hours. For each of these cases the curves of equal rainfall were drawn on the map and compared. The form of these curves, though occasionally irregular, in general approximates an ellipse, of which the major axis is not quite double the minor. In these cases the area of one-inch rainfall exceeded in length 500 miles ; in six cases of one-half-inch rainfall 750 miles ; frequently the entire area is an oval of more than 1,000 miles length and exceeding 500 miles breadth. In general the rain area centre is east of the low pressure centre, but in several instances the reverse was the fact, and in some cases the rainfall appeared to have had decided influence on the storm's progress, as to its direction. It was concluded that rainfall is not essential to low barometer areas, nor the chief cause of their formation or progressive motion. Such areas result from a general atmospheric movement toward a central area, and may be caused by unequal barometric pressure, unequal temperature, or unequal amounts of aqueous vapour. The two last-named causes are not comparable to the first of the three in cogency, and only deflect the winds slightly. The progress of areas of low barometer in all latitudes is mainly determined by the same causes as those which determine the general atmospheric circulation ; their

normal direction is changed by whatever causes may change the direction of the winds.

Prof. William Ferrel, of Washington, delivered a communication on the progressive movements of storms; the object being to show that the movement of great storms is determined by the currents—especially the upper currents—of the atmosphere.

Prof. Pickering presented the results of an investigation made in connection with Prof. W. A. Rogers on systematic errors in star declination. A comparison with the mean both of the earlier and later catalogues rendered probable the existence of systematic errors in the Gesellschaft catalogue.

Prof. Simon Newcomb presented a communication on the secular acceleration of the moon and its increasing deviation from uniformity through many years. He reviewed the existing theory on the subject; the calculation of Laplace according with Halley's estimate of the acceleration as about 10″ seconds of time, to be multiplied by the square of the centuries for a given period; also the Adams theory, which reduces the explanation of Laplace to about 6 seconds, leaving more than 4 seconds to be otherwise accounted for. In ascribing the surplus acceleration to diminished rotation of the earth, we are dealing with a subject where the evidence should be carefully weighed. Much dependence seemed to be placed on the records of ancient eclipses. Prof. Newcomb considered these eclipses separately. The most promising of the Greek solar eclipses was that of Agathocles, tyrant of Syracuse, occurring at the commencement of his voyage to attack Carthage. But we do not know on which side of Sicily he sailed; according to whether he was on one or the other side of the coast, the difference of time for that eclipse may be calculated as justifying the 10 seconds or the 6 seconds acceleration of the moon. The eclipse known as that of Thales has a record open still more to criticism, because it came to its historian by hearsay, and probably through two or three generations after the lapse of a hundred years. It seems curious that if Thales predicted the year (by an estimate of lunar periods) he did not also predict the day. Each of the ancient solar eclipses yielded similar elements of doubt on careful examination. From the records of lunar eclipses if all uncertain features be weeded out, the old estimate of acceleration will be reduced one half. The Arabian records of lunar eclipses were published at Leyden in the early part of this century. The work is very rare. Altitudes of sun and moon are constantly given in it. Calculations from these eclipses give the smaller estimate of acceleration. From all the data he has been able to study Prof. Newcomb concludes that the whole amount of acceleration is about 8·4 seconds. He hopes to make further estimates from modern records, having had the good fortune to pick up in Paris carefully compiled data of occultations going back to 1680.

In introducing his communication on "a Proposed New Method in Spectrum Analysis," Prof. S. P. Langley, of Allegheny Observatory, said that in giving this title to his description of his method, he believed, and, so far as he could ascertain, was justified in believing, that the method in this special application of it, was quite new. The process consists not only in placing in juxtaposition, simultaneously, the spectra of light from two opposite edges of the sun's disc (which had been done before), but also in determining that when these spectra are taken respectively from east and west edges, the atmospheric spectrum lines still coincide, while the solar lines of the two spectra do not coincide. Prof. Langley was anxious to disclaim any intention to abate one jot of the praise due to Prof. C. A. Young for conclusively demonstrating that the difference of wave-lengths from the east and west edges of the sun can be measured and its rotation thereby be proved. The history of this line of discovery was briefly given. Zöllner, Secchi, and Hastings thought they had perceived a change in the refrangibility of the light, and Vogel, using Zöllner's reversion spectroscope, obtained a displacement of from ·08 to 0·15 of one of Angström's units. Finally, Prof. Young, using a Rutherfurd grating, showed a velocity of the sun's equator of 1m. 42s.; and also that independent measurements of solar and atmospheric lines gave different results for these two classes. Prof. Langley's new method has the advantage of great security against instrumental errors, since the two classes of lines under like instrumental conditions, betray their diverse origin. In 1875, while studying the selective absorption of the solar atmosphere, Prof. Langley constructed an apparatus for comparing homogeneous light from different parts of the solar disc; use being made of two pairs of prisms of total reflection, connected with a spectroscope so as to give spectra from different parts of disc side by side. A photometric apparatus was attached to compare the relative intensities of light in different parts of these spectra. The whole apparatus was not intended at first for the comparison of individual lines of the spectrum, a purpose for which somewhat similar arrangements had been used by Lockyer, Hastings, and perhaps others; but Prof. Young's success suggested to Prof. Langley another and cognate method of using the principle of Doppler, to which this apparatus is well adapted. For six months Prof. Langley has been engaged in overcoming the instrumental difficulties of this conception. Only within a few days has he been able to produce complete results. When the apparatus is pointed so as to receive the light from the north and south poles of the sun, the lines are continuous in the two spectra; but when the instrument is rotated so as to take light from the east and west sides, all the solar lines are found discontinuous at the junction of the spectra, while the atmospheric lines remain continuous. If the instrument is rotated 180° the solar lines again appear discontinuous, but the spectrum whose solar lines were before shifted to the right as compared with the other, will after such rotation show them shifted to the left. In order to keep clear of any bias of judgment, Prof. Langley was careful not to know beforehand which way the instrument was pointed; but the displacement in every observation tallied with the theory. Essential aid was given in the construction of the instrument by the use of the choicest of glass gratings, ruled 8,600 to 17,200 lines to the inch, which Mr. Rutherfurd, of New York, sent for the purpose of this investigation. In the higher spectra of these admirable gratings thirty-one lines are discriminated in the E group where Angström and Kirchhoff have a dozen. On actual comparison for the fine lines of that group more have been counted with the grating than with the most powerful spectroscopes consisting of trains of twelve or more prisms. The method of analysis by Prof. Langley's instrument seems less adapted to quantitative work than Prof. Young's, but in this respect it is hoped also to make it useful by employing the micrometer upon the double displacement obtainable in right and left hand spectra of the same order presented simultaneously and in combination. By the observed displacement or fixity of any line we can now discriminate certainly as to its solar or telluric origin. It is hoped that a ready means of mapping atmospheric lines will thus be afforded, since indeed they are already mapped by this process before the eye of the observer.

Gen. J. G. Barnard, U.S.A., contributed a mathematical essay, also in part historical, on the internal structure of the earth as affecting the phenomena of precession and nutation, supplementary to an article under this head in vol. xix. of the "Smithsonian Contributions to Science," being the third of the "Problems of Rotary Motion." The paper shows that Gen. Barnard has coincided in Sir William Thomson's change of view. The formation of a diurnal tide in the fluid earth is called in doubt by this paper. In general it presents work of the kind that Sir William Thomson was longing for in his Glasgow address—a solution, coherently worked out, of the problem above indicated.

Prof. O. N. Rood, of Columbia College, New York, contributed two papers giving details of his researches concerning colours. Prof. Rood used a set of brilliantly coloured circular discs representing the chief spectrum colours, and also purple. By combining in successive proportions with these colours, a white disc, and giving the combined discs rapid rotation, the following results were attained: the lighter shades of vermilion became purplish; of orange, more red; of yellow, more orange; of greenish yellow, unchanged; of yellowish green, more green; of green, blue; of cyanogen blue, less greenish and more bluish; of cobalt blue, a more violet blue; of ultramarine, violet; of violet, unchanged; of purple, less red and more violet. Exactly similar effects were produced when violet instead of white was used to reduce the colours. Hence the mixture with white is the same as if the colours were moved towards the violet end of the spectrum. Prof. Rood thinks his results tend to indicate violet as one of the primary colours, which cannot be said of Maxwell's third fundamental colour, an artificial ultramarine, or Bezold's, a blue violet, careful tests of those colours having been fully carried out. The foregoing results were laid before Mr. Charles S. Peirce. He has reported at considerable length on the mathematical principles involved. He regards the results as in accordance with Fechner's law, that the sensation is proportional to the logarithm of the excitation. When the objective brilliancy of any light is varied, the specific subjective brightness is not changed in the least; but the only effect on the sensation is to add to, or subtract from it a variable amount of a certain constant sensation, which Mr. Peirce designates as the "colour of

brightness." This ceases to be true when negative logarithms are involved. The yellow of the spectrum comes very near the colour of brightness. From these considerations a diagram has been constructed showing the colorific effects of mixing white with any part of the spectrum. The results of theory as shown by the diagram, closely accord with those of experiment upon the sensation of colour.

Prof. Rood also presented a paper on Newton's use of the term "Indigo" as a prismatic colour. It was intended to indicate the range of the spectrum between the blue and the blue-violet regions. The order of refrangibility is thus stated: prussian-blue and indigo; cobalt blue; genuine ultramarine blue; artificial ultramarine blue.

Prof. Joseph Le Conte, of California, sent a communication on the structure of the crystalline lens and its relations to periscopism. The discovery of Dr. Hermann, and his deductions therefrom, were first considered. These are that the crystalline lens, by its structure, is endowed with the property of forming distinct images of objects though lying on the extreme margins of the field of view, of forming perfect images on the retinal screen, even to the extreme anterior margins. Thus the eye has an enormous field of view compared with optical instruments. The purpose of the structure is to give periscopism to the eye. Prof. Le Conte believes, however, that as far as periscopism is concerned this structure is of little if any value in man for want of a corresponding suitable retinal structure. The indistinctness of the retinal image is different from the indistinctness of an imperfect perception of the image, the former being due to the properties of the lens, the latter to the organisation of the retina. In proportion as we go upward in the scale of animal life we find the powers of the central spot of the optical apparatus more thoroughly developed for the purposes of binocular vision.

Prof. A. Mayer, of Stevens Institute, presented four communications. He described a "Vernier microscope," which he believes to be new. The object is to substitute an accurate and permanent scale cut on glass for the varying errors of a micrometer screw. The instrument is of small cost and its errors are not varying. On a glass plate a series of lines is cut in tenths of millimetres; the central millimetre is divided into ten parts. This scale slides in carefully wrought guides in front of the objective of a firmly fixed microscope. In the focus is another scale so adjusted that ten of its parts accurately subtend the image of $\frac{9}{10}$ths of the millimetre scale. Thus a Vernier is formed which reads down to the $\frac{1}{100}$th of a millimetre. The glass slide is so shaped that its rounded conical end abuts against the object to be measured. Readings to the full capacity of the instrument can be quickly obtained.

Prof. Mayer described his apparatus for measuring the expansion of metals and alloys under differences of temperature. It is believed that the coefficients of expansion, now inaccurately known, will be more correctly ascertained by this research.

The vibrations of tuning-forks received further investigation by Prof. Mayer; the cost of inquiry was defrayed by the Bache fund. The probable error in these determinations is the $\frac{1}{100}$ of one vibration, *i.e.*, with 256 vibrations to a second the probable error is $\frac{1}{25600}$ of a second. Differences in amplitude of vibration make no difference in the vibratory period of the fork; pressure applied to the fork also has no effect on the vibratory period, though it shortens the continuance of the note.

Prof. Mayer also described his investigations into the distribution of magnetism in long bar magnets. Some of these bars which were tested were five feet in length. Various methods have been tried for ascertaining the facts of magnetic distribution; Prof. Mayer gave due credit to other workers in this field, and described their experiments.

The Academy will hold its semi-annual meeting next autumn at New York.

NOTES

THE following is a list of the officers of the forty-seventh annual meeting of the British Association which will, as we have intimated, commence at Plymouth on Wednesday, August 15:—President Elect—Prof. Allen Thomson, M.D., LL.D., F.R.S., F.R.S.E. Vice-Presidents Elect—The Right Hon. the Earl of Mount-Edgcumbe, D.C.L., the Right Hon. Lord Blachford, K.C.M.G., Dr. William Spottiswoode, F.R.S., Dr. William Froude, C.E., F.R.S., Mr. Charles Spence Bate, F.R.S. General Secretaries—Capt. Douglas Galton, C.B., F.R.S., Dr. Philip Lutley Sclater, F.R.S. Assistant General Secretary—George Griffith, M.A., F.C.S. General Treasurer—Prof. A. W. Williamson, F.R.S. Local Secretaries—Messrs. William Adams, William Square, F.R.C.S., Hamilton Whitefore. Local Treasurer—Mr. Francis Hicks. The Presidents of the Sections are as follow:—Section A: Mathematical and Physical Science—President, Prof. G. C. Foster, F.R.S. Section B: Chemical Science—President, F. A. Abel, F.R.S. Section C: Geology—President, W. Pengelly, F.R.S. Section D: Biology—President, J. Gwyn Jeffreys, F.R.S., F.L.S. Department of Zoology and Botany, J. Gwyn Jeffreys, F.R.S., F.L.S. (President), will preside. Department of Anatomy and Physiology, Prof. Macalister, M.D. (Vice-President), will preside. Department of Anthropology, Sir Walter Elliot, K.C.S.I., F.L.S. (Vice-President), will preside. Section E: Geography—President, Admiral Ommanney, F.R.S., F.R.G.S. Section F: Economic Science and Statistics—President, the Right Hon. the Earl of Fortescue. Section G: Mechanical Science—President, Edward Woods, C.E. The reception room will be opened on Monday, August 13, at 1 P.M., and on the following days at 8 A.M., for the issue of tickets to members, associates, and ladies, and for supplying information. No tickets will be issued after 6 P.M. The first general meeting will be held on Wednesday, August 15, at 8 P.M., when Prof. Andrews, F.R.S., will resign the chair, and Prof. Allen Thomson, F.R.S., President Elect, will assume the Presidency, and deliver an Address. On Thursday evening, August 16, at 8 A.M., a *soirée;* on Friday evening, August 17, at 8.30 P.M., a Discourse by Prof. Warington Smyth, M.A., F.R.S., on the Physical Phenomena connected with the Mines of Cornwall and Devon; on Monday evening, August 20, at 8.30 P.M., a Discourse, but by whom not yet arranged; on Tuesday evening, August 21, at 8 P.M, a *soirée;* on Wednesday, August 22, the Concluding General Meeting will be held at 2.30 P.M. The local arrangements for the Plymouth meeting are not yet matured, but we believe they will include an exhibition of paintings chiefly by artists of Devon and Cornwall, including magnificent examples of Reynolds, Opie, Eastlake, Northcote, Cooke, Prout, &c. There will be excursions to Torquay or Kent's Hole, &c., and the Dart; up the Tamar or Cotehole; to the Moss Clayworks and over Dartmoor; to the Eddystone Breakwater and Government establishments; to the Caradoc mines; and to Penzance, the Lizard, the Land's End, &c.

A RECEPTION was held by the President of the Royal Society and Lady Hooker at Burlington House, on Wednesday evening June 13, which was largely attended. The invitations included ladies as well as men of science. The rooms were decorated with plants, and there was a collection of instruments and objects of scientific interest. Among the novelties were new spectroscopic instruments exhibited by Mr. Browning and Mr. Hilger; and Messrs. Tisley and Spiller's harmonograph curves, drawn on smoked glass.

A CONGRESS on Domestic Economy, organised by the Society of Arts, is to be held in Birmingham on July 18 and 19. Section A is to include (1) Needlework; (2) Cleanliness; (3) Food and Cookery; (4) Household Expenditure; (5) Thrift. Section B (6), Health; (7) Sickness; (8) The Dwelling; (9) Warming and Ventilation. Section C (10), Teaching the Subjects in Elementary Schools; (11) Text-books; (12) Inspection and Government Grants; (13) Importance of Female Inspectors; (14) Examinations. A number of papers are already promised, among them being papers by Mrs. W. E. Gladstone and Prof. Huxley. The Local Committee includes the Lords-Lieutenant